

Appl. No. 10/581,405  
Reply to Office Action of October 19, 2009  
Amdt. Dated January 19, 2010

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SPECIFICATION AMENDMENTS

Replace the paragraph on page 8, lines 5-7 with the following amended paragraph:

-- FIG. 4 is a ~~photography~~ view of a dummy glass tube arrangement in order to define a holder module for a sensor assembly for proton dosimetry; --

Replace the paragraph on page 10, lines 2-7 with the following amended paragraph:

-- The water phantom 14 comprises an open plexiglas box ~~46~~ 116, which can be filled up with water thanks to a pump connected to a water tank. Little steps of about 1 mm water thickness and big steps of about 10-20 mm have been chosen respectively in the Bragg-peak region and in the plateau as for the curves shown in FIG. 5. --

Replace the paragraph on page 10, lines 26-32 with the following amended paragraph:

-- The sensor head 12 produced for this experimental measurements uses a multiclاد bicron fibre (BCF-98) as optical fibre ~~44~~ 16. This optical fibre 16 comprises a polystyrene-based core and two layers of cladding. The outermost

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layer has the lowest refractive index  $n$  thus permitting total internal reflection at the second boundary. The fibre's diameter is 2 mm and the numerical aperture is 0.74. --

Replace the paragraph on page 14, lines 19-31 with the following amended paragraph:

-- FIG. 4 is a ~~photography~~ view of a dummy holder block 24 showing a variety of dummy glass rods 26 kept in a holder plate 28. The dummy glass rods 26 ~~are the representers for~~ represent the fibre sensors 18 (shown in Fig. 2) in an intermediate step of manufacturing the three-dimensional array of sensor heads 12 (shown in Fig. 1). At the tip of each dummy glass rod 26 a sensor head 12 will be located in the latter sensor assembly. ~~From the photography of~~ FIG. 4, it can be easily ~~derived~~ understood that the sensor heads 12 will be disposed in a plane similar to a 111-plane in a cuboid crystallic structure. Therefore, an incident proton is absorbed only in one distinct sensor head 12 in order to generate a reliable signal for the absorbed dose in the volume of sensor head 12. --

Replace the paragraph on page 15, lines 17-32 with the following amended paragraph:

-- An alternative embodiment for designing a three-dimensional array of sensors heads 12 is given in FIG. 6 exemplarily showing a two-dimensional

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section of a three-dimensional sensor assembly 30. This sensor assembly 30 comprises a holder plate 32 having openings 34 in which the fibre sensors 18 are inserted until they reach their end position defined by a stop plate 36. The ~~final reachment of the~~ end position is supported by a sealing ring ~~36~~ 136 that is disposed in an annular notch 38 formed in the cylindrical plexiglas holding member 22 and which snaps into a corresponding notch 40 in the holder plate 32. The holder plate 32 comprises in this specific embodiment two parts 32a, 32b that are attached by detachable means to each other known to the person skilled in the art, such as screws etc., in order to improve the possibility of assembling the fibre sensors 18 and even disassembling those ~~who~~ which failed in function. --